

2020 National Hydrologic Assessment

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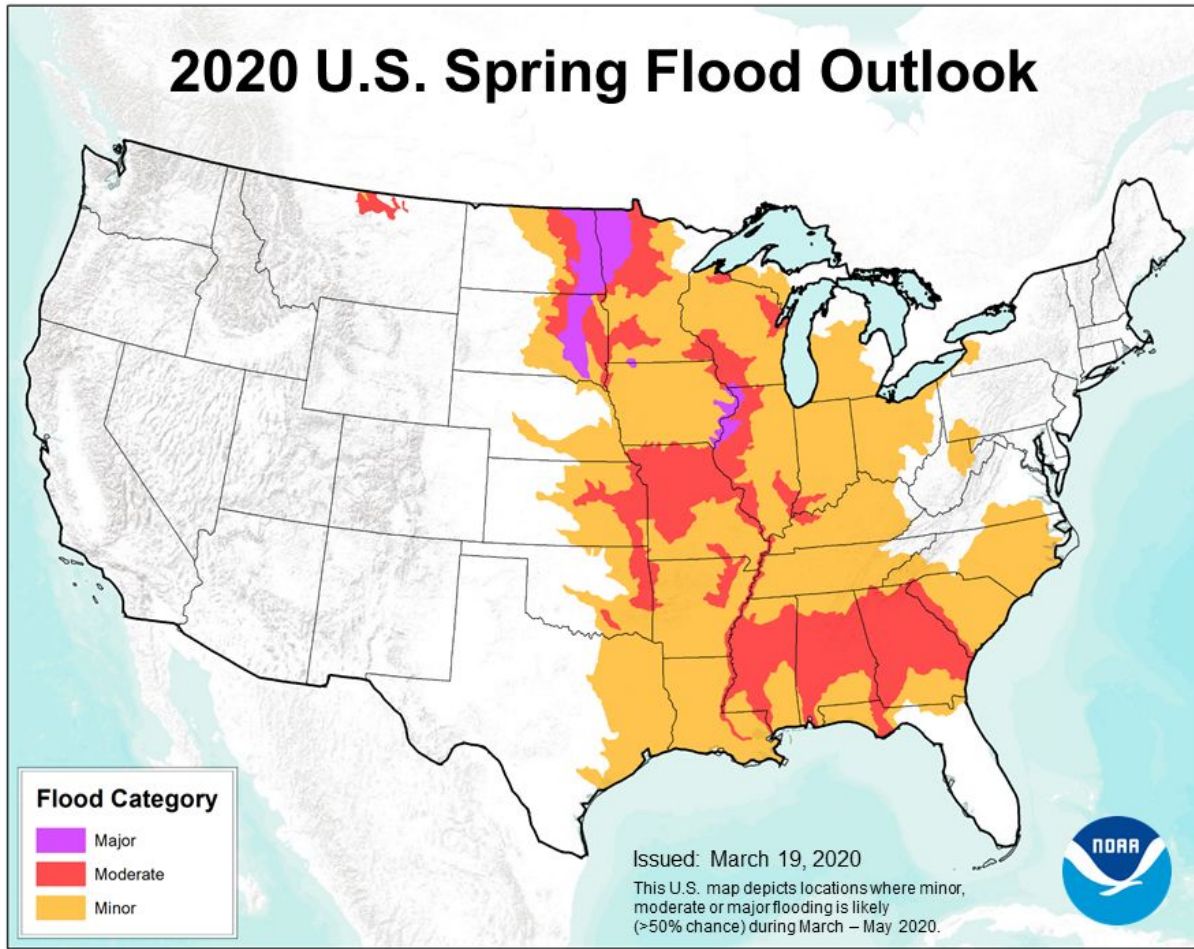


Figure 1: National Spring Flood Risk defined by risk of exceeding Minor, Moderate, and Major Flood Levels.

Executive Summary

The 2020 National Hydrologic Assessment offers an analysis of flood risk and water supply for spring 2020 based on late summer, fall, and winter precipitation, frost depth, soil saturation levels, snowpack, current streamflow, and projected spring weather. NOAA's network of 122 Weather Forecast Offices, 13 River Forecast Centers, National Water Center, and other national centers nationwide assess this risk, summarized here at the national scale.

This spring season, 128 million people face an elevated flooding risk in their communities, with 28 million at risk for moderate or greater flooding, and 1.2 million at risk for major flooding.

Above normal precipitation this past fall and winter has brought highly saturated soils to the Mississippi River Basin and much of the Southeast U.S. Above normal snow water content across much of the Upper Mississippi River Basin is already causing rises to near and above flood stage based on snowmelt runoff. A significantly elevated risk of widespread moderate to major flooding exists this spring across the Red River of the North basins, along the mainstem Mississippi, and in the eastern third of the Missouri River Basin. Above normal precipitation this fall and winter has led to widespread flooding conditions to the Lower Mississippi River Basin, as well as much of the Southeastern U.S. This wet pattern is expected to continue across the region, with above normal precipitation forecast into the spring.

Current water supply forecasts in the western United States generally indicate below normal conditions due to relatively dry weather this past fall and winter. Exceptions include the Upper Columbia, Upper Missouri, and Yellowstone basins, where above normal water supply is forecast.

The Alaska spring ice breakup flood potential is forecast to be above normal based on above normal snowpack across the interior Alaska, observed near normal ice thickness, and increased chances of above normal temperatures predicted through this spring.

The predicted spring flood risk across the Mississippi River Basin is anticipated to create conditions conducive to hypoxia development and an increased likelihood for an above normal hypoxic zone in the northern Gulf of Mexico this summer. Assuming typical summer conditions and the absence of major disruptive events such as tropical storms and hurricanes or drought conditions, a near normal hypoxia zone for the Chesapeake Bay is anticipated as upstream basins are not predicted with any elevated spring flood risk.

Heavy, Convective Rainfall and Flooding

The information presented in this report focuses on spring flood potential, using evaluation methods analyzed on the timescale of weeks to months, not days or hours. Heavy rainfall at any time can lead to flooding, even in areas where the overall risk is considered low. Rainfall intensity and location can only be accurately forecast days in the future, therefore flood risk can change rapidly. Stay current with flood risk in your area with the latest official watches and warnings at weather.gov. For detailed hydrologic conditions and forecasts, go to water.weather.gov.

NOAA's Experimental Long Range River Flood Risk Assessment

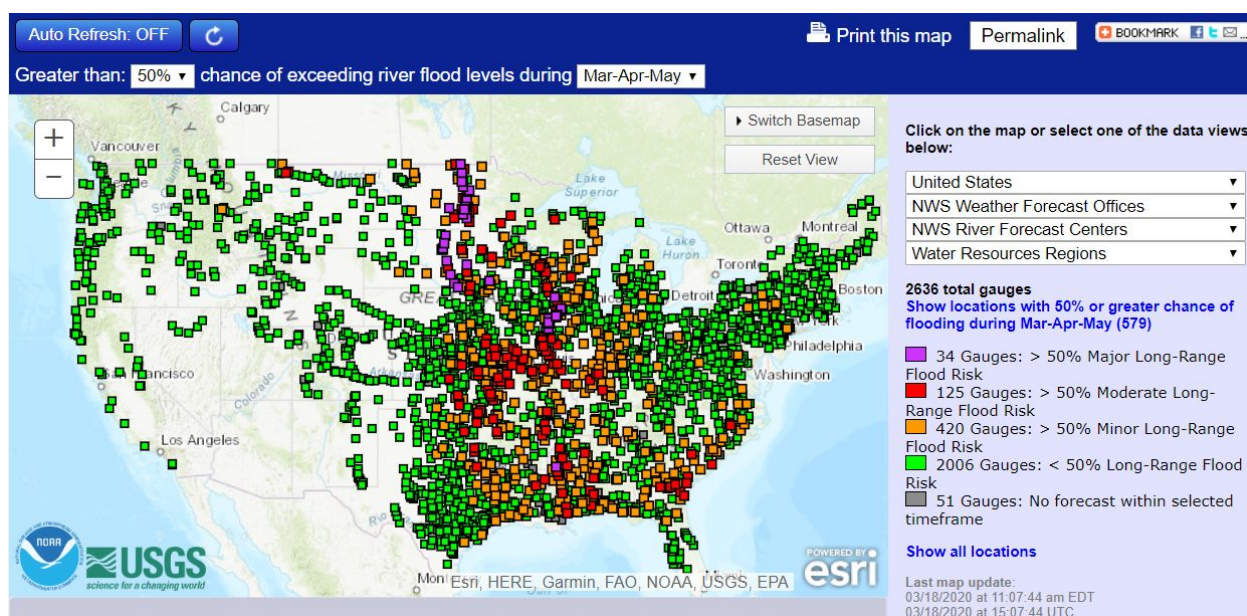


Figure 2: Greater than 50% chance of exceeding minor, moderate, and major river flood levels during March - April - May

At the request of national partners, including the Federal Emergency Management Agency (FEMA) and the US Army Corps of Engineers (USACE), the National Oceanic and Atmospheric Administration (NOAA) continues its improved decision support services with the "Long Range River Flood Risk" web page available at: https://water.weather.gov/ahps/long_range.php. Here, stakeholders can access a single, nationally consistent map depicting the 3-month risk of minor, moderate, and major river flooding as shown in Figure 2. This risk information is based on NOAA's Ensemble Streamflow Prediction (ESP) forecasts which are generated for approximately 2,600 river and stream forecast locations across the nation. With this capability,

stakeholders can quickly view flood risk predicted to affect their specific area of concern. The Long-Range River Flood Risk improves the value of the National Hydrologic Assessment by clearly and objectively communicating flood risk at the local level.

The sections below quantify river flood risk based on the river location having a 50% or more likelihood of exceeding minor, moderate, or major flood levels. The National Weather Service (NWS), in coordination with local officials, defines flood levels for each of its river forecast locations, based on the impact over a given area. The flood categories are defined as follows:

- Minor Flooding: Minimal or no property damage, but possibly some public threat (e.g., inundation of roads).
- Moderate Flooding: Some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations.
- Major Flooding: Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.
- Record Flooding: Flooding which equals or exceeds the highest stage or discharge observed at a given site during the period of record. The highest stage on record is not necessarily above the other three flood categories – it may be within any of them or even less than the lowest, particularly if the period of record is short (e.g., a few years).

Upper Mississippi River, the Red River of the North Basins, and the Lake Michigan Region

An elevated risk of widespread moderate to major flooding exists this spring along the Upper and Middle Mississippi River, and across the Red River of the North basins. This risk is mainly driven by highly saturated soil content due to much above normal precipitation in 2019; above normal snow water equivalent present at the time of issuance, particularly across eastern North Dakota, northern Minnesota, northern Wisconsin, and Lake Superior; and above normal chances of precipitation predicted through spring. Temperatures have been overall above normal this year, averaging 1 - 6 degrees Fahrenheit departure from normal. Above freezing temperatures have already started to thaw the ground, allowing infiltration through soils and reducing a concern of flooding associated with frozen ground. However, the warm temperatures combined with highly saturated soil already initiated some snowmelt-induced flooding. Though equal chances of temperatures are predicted through spring at the time of issuance, snowmelt rates and timing will be highly dependent on the observed spring temperatures and precipitation timing and pattern. The major flooding potential across the Red River of the North Basin is particularly dependent on the rate of snowmelt, along with rain on snow that could exacerbate runoff.

Additionally, varying risks of minor to moderate flooding exist for the rest of the region depending on the existing conditions of above normal soil moisture and snow water equivalent. In North Dakota, there is a potential of minor flooding along the Souris River Basin. In Minnesota, the Lower Minnesota River is expected to experience moderate flooding, while the Upper Minnesota River is expected to experience widespread minor flooding. In Wisconsin, mostly minor flooding is expected, including the Menominee River along the Wisconsin / Michigan border, and isolated moderate to major flooding could occur along the Wisconsin, Trempealeau, Kickapoo, Tyler Forks, and Wolf Rivers. In eastern Iowa, eastern Missouri, and Illinois, widespread minor flooding is expected along the Mississippi River tributaries and the Illinois River. In Michigan, minor flooding is expected along the Muskegon, Grand, St. Joseph, Menominee, and Rifle Rivers. Due to elevated levels of Lake Michigan, backwater is expected to affect and cause minor to moderate flooding along the East, Fox, Oconto, and Manitowoc Rivers in Wisconsin, as well as towns along the shore in Illinois and Michigan.

Although a few locations have already experienced break-up ice jam flooding, a below normal to normal risk of break-up ice jam flooding exists due to recent above-freezing temperatures preventing additional river ice from forming. The risk of break-up ice jam flooding should

remain low, depending on late winter and spring temperature fluctuations; however, isolated ice jam flooding, especially on tributaries, cannot be ruled out.

Missouri River Basin

In the Missouri River Basin, an elevated major flooding risk exists along the James (South Dakota) and upper Little Sioux Rivers. The middle and lower Missouri River and its tributaries are likely to experience widespread minor to moderate flooding. This risk is mainly driven by saturated soil conditions and above normal precipitation observed so far this winter (100 -175%), combined with predictions of above normal chances of precipitation through spring. Temperatures have been overall above normal this year, averaging 1 - 6 degrees Fahrenheit above normal, lowering the concern for frozen ground and ice jam flooding. Snowmelt runoff already is causing renewed, moderate to major flooding to the James River, and elevated streamflows in the Upper Midwest. Snow water equivalent of 1 to 3 inches, with isolated higher amounts still remains across eastern North Dakota, and flooding along the James River is expected to persist through summer. Significant flooding due to snowmelt runoff alone from the Intermountain West is not likely due to slightly above normal snowpack.

In Montana, moderate flooding is expected along some tributaries to the Milk River. For the rest of Montana, the flooding threat is predicted to be near normal. While mountain snowpack is above normal statewide, valley and plains snowpack remains below normal. In North Dakota, minor flooding is expected across the upper James River basin. In South Dakota, major flooding is expected to continue along the James River, while moderate flooding is expected along the upper Big Sioux River. In Nebraska, minor flooding is expected along several rivers and creeks, such as the Platte and Big Blue Rivers. In western Iowa, moderate flooding is expected along the lower Big Sioux River while minor flooding is expected along several rivers. While the majority of the Little Sioux River is expected to experience minor flooding, major flooding is anticipated along the upper portions of the basin. In eastern Kansas, moderate flooding is expected along the Lower Smoky Hill and Marais des Cygnes Rivers, while minor flooding is expected along several rivers. In Missouri, widespread minor to moderate flooding is expected across several basins, such as the Grand and Osage River basins, as well as the mainstem Missouri River.

Ohio, Cumberland, Tennessee River Valleys, and the Lake Erie Region

An above normal flood risk is expected across the lower half of the Ohio Valley into the Cumberland and Tennessee Valleys through spring. Widespread minor to moderate flooding is expected in this region due to above normal precipitation this winter, resulting in highly

saturated soil conditions. In addition, above normal chances for rainfall are predicted through spring.

In eastern Illinois and Indiana, minor flooding is expected along the Maumee while minor to moderate flooding is expected in the Wabash, White, Little Wabash and Patoka River basins. In Kentucky and Tennessee, minor flooding is expected across portions of the Kentucky, Rough, Cumberland, and Tennessee River basins with minor to moderate flooding expected in portions of the Green River Basin. In Ohio, minor flooding is expected along the Maumee, Muskingum, Great Miami, and Scioto River basins, while streams draining into Lake Erie may experience high streamflow due to record high lake levels. Minor flooding is also expected along the Lower Ohio River mainstem.

Much of the susceptibility to flooding in this region is driven by individual convective rain storms typical in the spring causing heavy rain on areas of elevated streamflows and soil moisture, conditions currently found in all but the eastern third of the Ohio River Basin.

Arkansas and Red River Basins

Minor to moderate flooding is expected across portions of the eastern third of the Arkansas and Red River basins. This risk is largely driven by above normal precipitation observed during the early winter (100 to 200% of normal), saturating the soil and resulting in above normal streamflow, combined with convective rain storms typical in the spring.

In southeast Kansas and northeast Oklahoma, minor to moderate flooding is expected in the Neosho and Spring River basins. In eastern Oklahoma, minor to moderate flooding is expected across Bird Creek, Caney, Poteau, and Illinois basins. In southeast Oklahoma, minor to moderate flooding is expected on Clear Boggy Creek, Blue, and Little River basins. In west-central Arkansas, minor flooding is expected along the Arkansas, Fourche LaFave, and Petit Jean Rivers.

Lower Mississippi River Basin and its Tributaries

Currently, the Lower Mississippi River Basin and its tributaries are experiencing widespread minor to moderate flooding due to much above normal precipitation observed throughout winter combined with routed flows from upstream, leading to saturated soil conditions and high streamflows. The ongoing flooding is anticipated to continue well into this spring, with an above normal risk of widespread flooding across upstream basins and above normal chances of precipitation predicted through spring.

In northeastern Arkansas, minor to moderate flooding is expected to continue along the Lower White River. Minor flooding is expected across the Ouachita River Basin in southern Arkansas into Louisiana. In Louisiana, minor flooding is expected along the Ouachita River. In Mississippi, moderate flooding is expected along the Big Black River while minor to moderate flooding is expected along the Yazoo River.

Southeastern United States

Minor to isolated moderate flooding is ongoing near the coast of the Southeast due to above normal precipitation observed so far this fall and winter (100 to 200% of normal), leading to saturated soil conditions and much above normal streamflows. The elevated flow conditions are anticipated to continue into early spring with more precipitation predicted to persist.

Moderate flooding is expected across the Pearl River Basin in Mississippi; the Tombigbee, Black Warrior, Tallapoosa, and Alabama River basins in Alabama; the Coosa River Basin in Alabama and Georgia; the Apalachicola River Basin in Alabama, Georgia, and Florida; and the Altamaha, Ogeechee, and Savannah River basins in Georgia and South Carolina. Reservoirs in these areas remain much above normal, and above-normal precipitation is expected into mid-April.

Texas and Southeast Louisiana

A near normal minor flood risk exists for portions of the upper Sulphur, upper Sabine, Neches, upper Trinity, San Jacinto, Brazos, San Bernard, and Lower Colorado River basins in Texas due to near to above normal antecedent conditions across northern, central, and eastern Texas from above normal rainfall the area received over the past 90 days. Dry antecedent conditions exist across southern Texas, resulting in a below normal flood risk for the Lower Rio Grande and Nueces River basins. In southeastern Louisiana, minor flooding is possible across the Atchafalaya River basin due to above normal soil moisture from above normal precipitation the area received over the past several months.

Northeast

The Northeast region features a normal to below normal spring flood risk, with a below normal risk for parts of southern New Hampshire, southern New England, and the southeast portions of New York State to include the Catskill Mountain region, and a normal risk across Maine, northern New Hampshire, Vermont and New York State north of the Mohawk River. These risks are largely driven by the lack of snow cover and available snow water equivalent observed across the region despite near-normal streamflow and soil moisture conditions. Normal snow

water equivalent conditions exist across northern portions of the region while below normal snow water equivalent conditions exist across the majority of southern portions of the region.

One to two feet of river ice has been observed along rivers in far northern New York State, northern Vermont, northern New Hampshire and interior Maine so far this year , and will continue into spring depending on temperature fluctuations. The threat of flooding due to break-up ice jams is near normal across the aforementioned states, with a normal risk of snowmelt runoff expected given the forecast for a warmer-than-normal March.

Middle Atlantic Region: Virginia, Maryland, Washington D.C., Pennsylvania, and Delaware

Currently, below normal snowpack and normal to below normal streamflow conditions point to a lower than normal risk of spring flooding across the Mid-Atlantic region. Near normal precipitation fell across the Mid-Atlantic this fall and winter. However, the past 30 days were particularly dry with most locations receiving only 25 to 50% of normal precipitation. The extent of snow cover and available snow water equivalent is below to much below normal for this time of year. At this time, only patches of snow remain across portions of northern Pennsylvania and New York. Little, if any, river ice remains on rivers within the Mid-Atlantic region, and no additional river ice formation is expected.

Western U.S.

Mid-March is still too early to determine final spring flooding potential across the western United States due to snowmelt since heavy snowpacks at higher elevations are expected to persist and even build over the next month. The duration and intensity of potential flooding will depend on future precipitation and temperatures.

There is still ample time left in the accumulation period for the spring flood potential to change across the West. Even in areas where the spring flood risk is near to below normal, some smaller streams and flood prone areas may experience minor flooding with a sudden warm-up, the occurrence of heavy rains, or thunderstorms over those watersheds. Rapid warming can lead to elevated melt rates. During the snowmelt season, when rivers and streams are flowing at or near capacity, any precipitation can increase the risk of flooding.

In general, below normal precipitation has limited the snowpack to the low elevations for much of the western U.S. and resulted in the prediction of normal to below normal snowmelt flood risks during spring at the time of issuance.

In Washington, the rivers with the greatest risk of spring flooding are the Naches and Pend Oreille. The risk of small stream and overland flooding is about normal to slightly above normal in the extreme southeast and northeast corners of the state due to above normal precipitation and mountain snowpack over the last couple of months. A normal spring flood risk exists for the rest of the state.

The risk of spring flooding along the Grand Ronde, Umatilla, and Walla Walla Rivers in far-northeast Oregon is slightly elevated due to above normal snowpack in the Wallowa and northern portions of the Blue Mountains. Any flooding would likely be driven by a combination of snowmelt and rainfall runoff. The risk of spring flooding is lower than normal for the rest of Oregon due to low snowpack.

The risk of spring flooding due to snowmelt is near normal across most of Idaho. The exception is the Big Lost Basin and the Wood River basins where the risk is below normal due to well below normal snowpack and low soil moisture.

The risk of spring flooding due to snowmelt alone is below normal across California, Nevada, Arizona, and Colorado due to below normal snowpack and normal to below normal antecedent conditions at the time of issuance. The exceptions are the Owyhee, Bruneau, and Jarbidge basins in northeastern Nevada as well as the Grande Ronde basin in northeast Oregon where an above normal spring flood risk exists as snowpack and precipitation are slightly above normal.

Water Supply

Western U.S.

Water supply forecasts are produced by the River Forecast Centers in the western United States. Forecasts reflect current hydrologic conditions including snowpack, soil moisture, weather forecasts, and climate information. As these conditions change, especially over the next couple months, forecasts will be updated to reflect these changes at [the Western Water Supply Forecasts](#).

Northwest

Northern portions of the Northwest are expected to experience normal to above normal water supply through September. Southern portions of the region are expected to experience below normal water supply due to varying combinations of current snowpack, fall and winter precipitation, and the resulting current antecedent conditions. As of issuance, mountain snowpack is near normal for northeast and far southeast Oregon, and below normal for the central Oregon mountains and the Cascades. Snowpack is below normal for southwest and

south-central Oregon, as well as central Idaho. Low streamflows across portions of the Central Mountains of Idaho could lead to water supply concerns for those relying on natural flows. Above normal snowpack exists across the Upper Columbia and Upper Snake River basins in northern and southeastern Idaho. However, water supply forecasts indicate near normal to below normal volumes due to below normal fall and early winter precipitation, resulting in drier antecedent conditions. Water supply forecasts for April-September runoff volume across the Northwest is summarized below.

- Upper Columbia basin: 100 to 115% of normal
- Snake River basin: 65 to 100% of normal
 - Big Wood and Little Wood basins in Idaho: 35 to 55% of normal
- Columbia River at The Dalles (a good index of conditions across the Columbia Basin): 100% of normal
- Northeast Oregon basins: 95 to 115% of normal
- Northwest Oregon basins: 60 to 90 % of normal
- Southern and north-central Oregon basins: 40 to 80% of normal
- Northwestern Washington basins: 90 to 110% of normal
- Southwestern Washington basins: 80 to 90% of normal

Upper Missouri River Basin

Based on near normal to slightly above normal snowpack in the high elevations, normal to slightly above normal runoff is forecast for April through September over the Upper Missouri, Yellowstone, and Platte basins as follows:

- Upper Missouri River Basin above Fort Peck, MT: 110% of normal
- Yellowstone River Basin above Sidney, MT: 115% of normal
- North Platte River Basin above Seminoe Reservoir: 100% of normal
- South Platte River Basin above South Platte, Colorado: 105% of normal

California

Northern portion of the Klamath Basin down to the Tulare Basin in the Southern Sierra Nevada in California is experiencing much below normal snowpack. February precipitation totals were

one of the lowest on record for California. This dry month has driven snowpack totals down to around 45% of normal over the state so far this fall and winter, and about 40% of normal for April 1st. The seasonal runoff forecasts are highly dependent on the snowpack conditions. Below normal runoff volumes can be expected during April through July throughout the southern Cascades and the western Sierra Nevada.

Nevada

Snowpack is near normal to below normal for the Humboldt and much below normal in the eastern Sierra headwaters of Nevada, but it is slightly above normal in the Owyhee, Bruneau, and Jarbidge basins of northeastern Nevada. Soil moisture measured in headwater locations is generally below normal. Although reservoir conditions are well above normal in Nevada, April through July runoff forecasts depend on the snowpack conditions and are expected to be below normal to normal in Nevada as follows:

- Rivers and streams of the eastern Sierra: 20 to 50% of normal
- Humboldt Basin: 30 to 70% of normal

Colorado River and Great Basins

Below normal soil moisture leading up to the winter season and below normal precipitation this fall and winter are negatively impacting water supply forecasts across the Colorado River and eastern Great basins in Utah, Colorado, and Arizona. The April through July Water Supply runoff forecasts for Colorado are listed below:

- Yampa and White Basin: 90 to 110% of normal
- Upper Colorado Mainstem: 75 to 105% of normal
- Gunnison Basin: 65 to 90% of normal
- Dolores and San Miguel Basin: 75 to 85% of normal
- San Juan Basin: 65 to 85% of normal

Early March snowpack conditions remain above normal in the Six Creek basin, near normal in the Bear, Weber, Provo/Utah Lake, and Sevier basins, and below normal to normal elsewhere in Utah. The water supply forecasts in Utah from April through July are as follows:

- Bear and Six Creeks basins: near normal
- Weber, Provo/Utah Lake, Sevier, Virgin, Duchesne basins: 50 to 90% of normal

Below normal snowpack, ranging 40 to 80% of normal, and near normal soil moisture conditions exist in Arizona. With below normal precipitation predictions through spring, water supply forecasts for March through May are generally below normal as follows:

- Verde River Basin: 60% of normal
- Salt River Basin: 90% of normal
- Upper Gila River Basin: 80% of normal

Water Resources East of the Rockies

Projections of surface water availability provided by the National Weather Service play a crucial role in water resource decision making in other regions of the country. Warm, dry conditions in February across parts of the Southern Plains may expand drought conditions through the spring and summer across portions of deep South Texas, eastern New Mexico, and the Oklahoma and Texas Panhandles, where reservoirs are well below capacity.

Across the rest of the country, above normal precipitation produced significant rises on area rivers and lakes across the lower Missouri, lower Mississippi River, and Southeast basins. Hence, reservoir and lake levels across the region have risen to or are above their respective conservation pool stages. Across the lower Ohio Valley, soil moisture conditions remain near to above normal and streamflows are near normal with the wettest conditions observed over southern Kentucky. Regionally, reservoir levels are above normal. Additionally, most water supply reservoirs across the Northeast are holding near normal to above normal storage, and most major reservoirs within the Mid-Atlantic region are holding storages that are about normal for this time of year.

Alaska Spring Ice Breakup Outlook

The Alaska Spring Ice Breakup flood potential is forecast to be above normal along the Kuskokwim River, Tanana River, Yukon River, Koyukuk River, Copper River, and the North Slope of Alaska. This outlook is based on observed ice thickness, snowpack, and forecast long range temperatures.

River Ice

March ice thickness data are available for a limited number of observing sites in Alaska. Late February to early March measurements indicate that ice thickness is near normal across the

state, except the upper Yukon River Basin at Eagle, where the ice thickness is currently 150% of normal.

Snowpack

Analysis of the March 1st snowpack by the Natural Resources Conservation Service (NRCS) indicates above normal snowpack across interior Alaska ranging from 125% to 175% of normal. The Yukon government is also reporting greater than normal snowpack across the Upper Yukon River Basin in Canada. Snowpack is near normal over the North Slope of Alaska, and along the Gulf Coast, and along Southeast Alaska.

Climate Outlook

The most important factor determining the severity of ice breakup remains the weather during April and May. Dynamic breakups with a high potential for ice jam flooding typically require cooler than normal temperatures for most of April followed by an abrupt transition to warm summer-like temperatures in late April to early May. The temperature outlook for late March and early April suggests an increased chance of below normal temperatures over southern Alaska and above normal temperatures over northern Alaska. The longer 3-month outlook, which includes March, April and May, indicates increased chances of above normal temperatures in Alaska.

Spring Flood Outlook and Implications for Gulf of Mexico and Chesapeake Bay Hypoxia

The predicted spring flood risk across the Mississippi River Basin is anticipated to create conditions conducive to hypoxia development and an increased likelihood for an above normal hypoxic zone in the northern Gulf of Mexico this summer. Areas of minor to moderate flooding risk and isolated areas of major flood risk is predicted across portions of the central Mississippi River Basin. Increased flood conditions, should they occur, may lead to higher than normal springtime discharge of nutrients and freshwater from the Mississippi River into the Gulf of Mexico. These conditions can promote hypoxia formation and spread the hypoxic zone. This cause and effect relationship, however, can be confounded by weather events such as tropical storms and hurricanes, which can locally disrupt hypoxia formation and maintenance.

In the northern Gulf of Mexico a large area of hypoxia forms in the bottom waters during the summer months, often times reaching in excess of 5,000 square miles. This area of hypoxia, otherwise known as the “dead zone”, is strongly influenced by precipitation patterns in the Mississippi-Atchafalaya River Basin (MARB), which drains over 41% of the contiguous United

States. Changes in precipitation will influence river discharges into the Gulf, which carry the majority of nutrients helping to fuel the annual dead zone, so examining spring flood risk in the MARB can provide a useful indicator of the possible size of the dead zone during the summer.

In the Chesapeake Bay, recurring summer hypoxia has also been linked to nutrient loadings and river discharge, especially from the Susquehanna and Potomac River basins. Assuming typical summer conditions and the absence of major disruptive events such as tropical storms and hurricanes or drought conditions, a near normal hypoxia zone for the Chesapeake Bay is anticipated as these aforementioned basins are not predicted to have any elevated spring flood risk.

The spring flood outlook provides an important first look at some of the major drivers influencing summer hypoxia in the Gulf of Mexico and Chesapeake Bay. In early June, the measured river discharge amounts and corresponding nutrient concentrations will be available from the U.S. Geological Survey. This information is used by [NOAA](#) and [others](#) to release annual dead zone forecasts for the Gulf of Mexico and Chesapeake Bay. In the summer, the dead zone sizes will be measured and compared against the predictions. Hypoxia forecast models that evaluate the size of the dead zone based on causative factors such as watershed nutrient loading deliver critical information to the [Gulf of Mexico/Mississippi River Watershed Nutrient Task Force](#) and [Chesapeake Bay Program](#) to assess the effectiveness of watershed nutrient reduction efforts to reduce the size of their respective dead zones. The National Weather Service and Ocean Service are working with States to develop new tools to [forecast runoff risk](#) which should help limit nutrient runoff to the Gulf of Mexico, Chesapeake Bay, Great Lakes and other regions by identifying the optimal times for fertilizer application within these watersheds.

NOAA's Role in Flood Awareness and Public Safety

Floods kill an average of 90 people each year in the US. The majority of these cases could have been easily prevented by staying informed of flood threat and following the direction of local emergency management officials.

To help people and communities prepare, NOAA offers the following flood safety tips:

- Determine whether your community is in a flood-risk area and continue monitoring local flood conditions at <https://water.weather.gov>.
- Learn what actions to take to stay safe before, during and after a flood at <https://www.weather.gov/safety/flood> and <https://www.ready.gov/floods>.

- Visit <https://www.floodsmart.gov> to learn about FEMA's National Flood Insurance Program and for flood preparedness advice to safeguard your family, home and possessions.
- Purchase a [NOAA Weather Radio All- Hazards](#) receiver with battery power option to stay informed of quickly changing weather information.
- Study evacuation routes in advance and heed evacuation orders.
- [Turn Around, Don't Drown](#) – never cross flooded roads, no matter how well you know the area or how shallow you believe the water to be.

NOAA's National Weather Service is the primary source of weather data, forecasts and warnings for the United States and its territories. It operates the most advanced weather and flood warning and forecast system in the world, helping to protect lives and property and enhance the national economy. Visit us [online](#) or on [Facebook](#) and [Twitter](#)

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About This Product

The National Hydrologic Assessment is a report issued each spring by the NWS that provides an outlook on U.S. spring flood potential, river ice jam flood potential, and water supply. Analysis of flood risk integrates late summer, fall, and winter precipitation, frost depth, soil saturation levels, streamflow, snowpack, temperatures and rate of snowmelt. A network of 122 Weather Forecast Offices and 13 River Forecast Centers nationwide assess the risk summarized here at the national scale. The National Hydrologic Assessment depicts flood risk over large areas, and is not intended to be used for any specific location. Moreover, this assessment displays river and overland flood threat on the scale of weeks or months. Flash flooding or debris flow, which accounts for the majority of flood deaths, is a different phenomenon associated with weather patterns that are only predictable days in advance. To stay current on flood risk in your area, go to water.weather.gov for the latest local forecasts, warnings, and weather information 24 hours a day.